MAY 27 1993

GRIFFIN INTERNATIONAL INC

20 May, 1993

Mr. Franklin S. Billings, Jr.
4 Bond Street
Woodstock, Vermont 05091

RE: Investigation of Residual Subsurface Petroleum Contamination
Billings Residence, Woodstock, Vermont VTDEC Site #93-1365

Dear Mr. Billings:

This letter summarizes the investigation of residual subsurface petroleum contamination recently completed at the above referenced site. This work has been conducted by Griffin International, Inc. (Griffin) at your request in response to the 8 March 1993 letter to you from the Vermont Department of Environmental Conservation (VTDEC). The work has been conducted to help define the degree of residual petroleum contamination in the vicinity of a 1,000 gallon heating oil tank which was removed from the Billings residence on 26 January 1993.

Site Description

The Billings residence is located on the West side of Bond Street in the village of Woodstock, Vermont. A Site Location Map appears on page A1 of the Attachment. Drinking water for the Billings residence and all surrounding properties is supplied by the Woodstock Aqueduct Company which draws water from a drilled well approximately one mile away. There are no private water supply wells on the Billings property or on any adjacent properties. The heating oil tank removed from the property was used to supply the Billings residence furnace. The tank was replaced by a double walled steel tank with cathodic protection. Kedron Brook is to the west of the property and flows northerly.

INVESTIGATIVE PROCEDURES

In an effort to determine the degree of residual petroleum contamination in the vicinity of the former underground storage tank (UST), Griffin installed one monitoring well and attempted to collect groundwater samples to be analyzed for petroleum related compounds. Additionally, the basement of the Billings residence was visually inspected and screened with a PID for residual petroleum

contamination. Kedron Brook was also inspected. Measurements for a site map were collected and a survey of sensitive receptors completed. Details and results of the work completed follow.

Monitoring Well Installation

On 5 April 1993, one monitoring well (MW1) was installed by Green Mountain Boring, of Barre, Vermont under the direct supervision of a Griffin Hydrogeologist. The well was installed five feet west of the former UST location. A Site Sketch showing the location of MW1 appears on page A2. The monitoring well could not be placed directly into the former UST pit due to the presence of the replacement tank.

The monitoring well was installed using a hollow stem auger drill rig. Undisturbed soil cores were collected in a split spoon sampler at five foot intervals from the borehole. Split spoon corings and drill cuttings collected directly from the augers were screened for volatile organic compounds (VOCs) using an Hnu Model PI101 photo-ionization detector (PID) and logged by the hydrogeologist. Soils encountered in the borehole consisted of four feet of topsoil overlying a silty, poorly sorted, fine to coarse sand with some gravel and occasional cobbles. No petroleum odors and no elevated PID readings were observed during drilling or during inspection of the soil core samples. PID readings and soil characteristics observed during monitoring well installation appear on the detailed well log on page A3. The boring was advanced to refusal at sixteen feet below grade. It is believed that refusal was caused by bedrock. No groundwater entered the well after installation.

The monitoring well is constructed of two inch diameter PVC well screen and casing. The annulus between the borehole wall and the screened section of the well contains a silica gravel pack to filter fine sediments from groundwater entering the well. The annulus of the well also contains a bentonite seal to prevent surface water from infiltrating into the borehole. The well is protected at the surface by a locking well cap, a flush mounted steel well head protection casing, and bolt down cover. Well construction details appear on the well log, page A3.

Basement Inspection/Indoor Air Screening

Also on 5 April, Griffin inspected the basement of the Billings residence for residual petroleum contamination. A visual inspection revealed no evidence of petroleum contamination in the basement. The areas of the basement inspected included the furnace area, the foundation area along the west side of the basement where the ¼ inch fuel delivery line from the former and existing UST passes through the foundation, and the basement floor area where the sewer line passes through the floor. The sewer line passes through the floor adjacent to where the fuel delivery line for the furnace enters the basement. Screening of the areas described yielded no elevated PID readings which indicates that no PID detectable volatile organic compounds were present. A Site Detail Map appears on page A4. The basement floor is of poured concrete construction, and the foundation walls of laid up field stone. No petroleum odors were detected during the inspection.

Inspection of Kedron Brook

Kedron Brook was inspected for evidence of petroleum contamination on 5 April. During the inspection no evidence of petroleum contamination such as oil staining, dead or stressed vegetation, or petroleum odors or sheens were identified.

Groundwater Sampling

On 14 April 1993, Griffin visited the site to collect groundwater samples from MW1. During the sample collection attempt it was determined that the monitoring well was dry and that no groundwater had entered the well. Therefore, no groundwater samples were collected from MW1.

Risk Assessment

Based on the results of the above investigation, it appears that there is little or no risk posed to the Billings residence by the residual petroleum contamination observed during the UST removal. There is no visual evidence, or PID data, which indicates petroleum contamination of the Billings basement. No petroleum odors, sheens, or elevated PID readings were detected during installation of MW1. This suggests that petroleum contamination in soils adjacent to the former UST is not extensive.

There are no private water supply wells in the immediate vicinity of the former UST. The village of Woodstock is served by the Woodstock Aqueduct Company. This municipal water supply system draws water from a distant source, and is at little or no risk from the low degree of petroleum contamination associated with the former heating oil UST at the Billings residence.

Inspection of Kedron Brook revealed no evidence of petroleum contamination. Inspection of Kedron Brook on 26 January 1993, made after removal of the UST, also indicated no petroleum contamination. Based on the low levels of residual petroleum contamination observed in the former UST pit, the distance to Kedron Brook, and the lack of detectable petroleum contamination along the brook's banks, there appears to be little or no risk to the brook.

Conclusions

Based on the above investigation, Griffin has reached the following conclusions:

1) The former 1,000 gallon heating oil tank was removed from the Billing's property on 26 January 1993. A new, double walled replacement tank with cathodic protection was installed. Removal of the former tank has resulted in the removal of the source of the petroleum contamination observed during tank removal.

2) Inspection of the Billings residence basement indicates that petroleum contamination does not extend laterally into the basement at detectable levels. No petroleum contamination was detected from the surface to sixteen feet below grade during the installation of MW1, located five feet west of the former UST location. These observations indicate that residual petroleum

contamination does not extend laterally in detectable amounts into the Billings basement or to the vicinity of MW1.

3) There is little or no risk to any of the sensitive receptors identified. This includes the Billings residence basement, and Kedron Brook. No private water supply wells exist on the Billings property or adjacent properties which are all served by the Woodstock Aqueduct Company.

Recommendations

Based on the findings of this investigation, which indicate that residual petroleum contamination is minimal, Griffin is recommending no further monitoring or remedial actions at this site. The Billings residence site is recommended for closure and removal from the Vermont Hazardous Waste Sites List.

Griffin is pleased to have conducted this work for you. If you have any questions, please call.

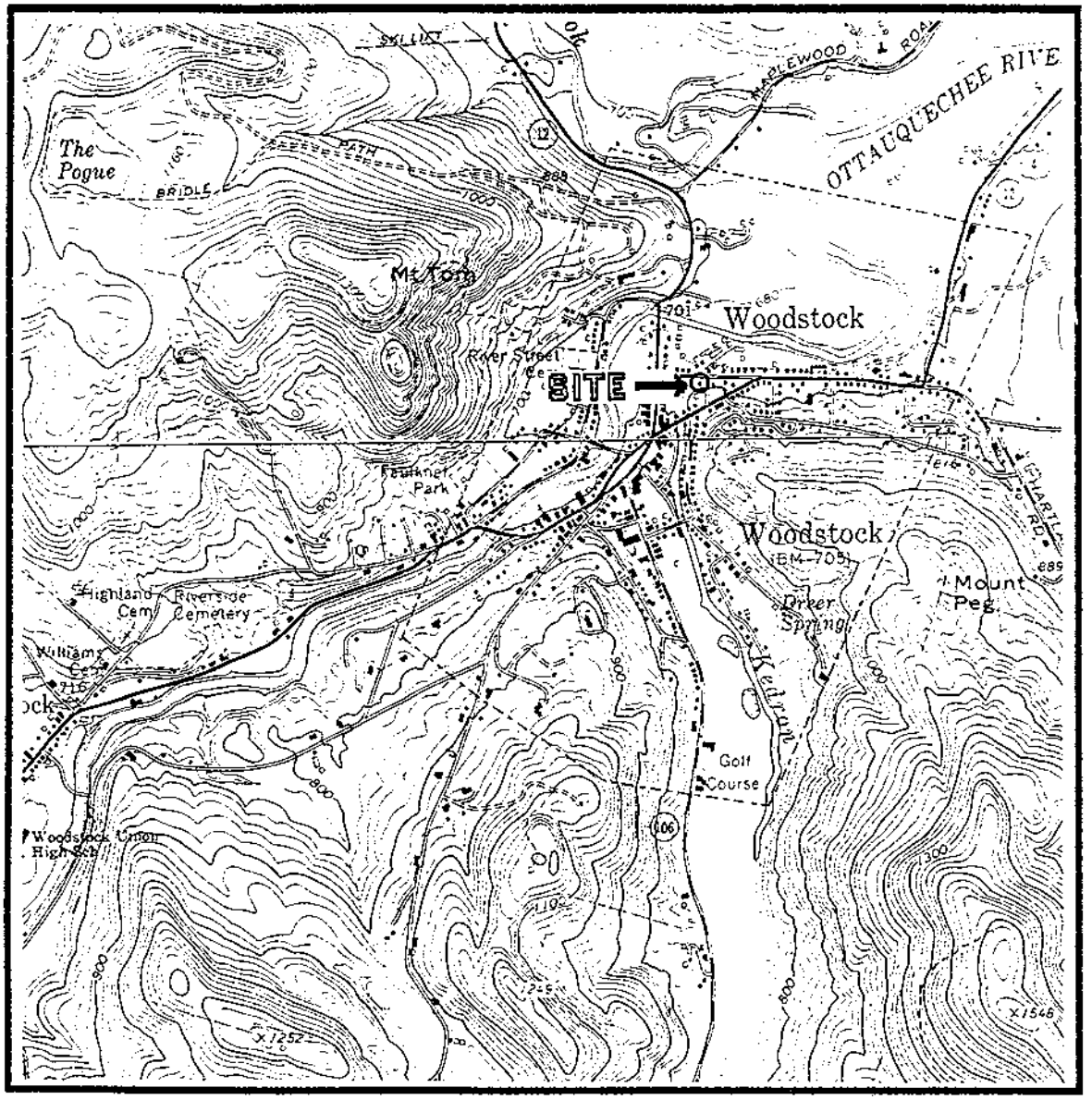
Cordially,

Christopher Hill
Hydrogeologist

Attachments
cc. Charles B. Schwer, VTDEC

SITE LOCATION MAP

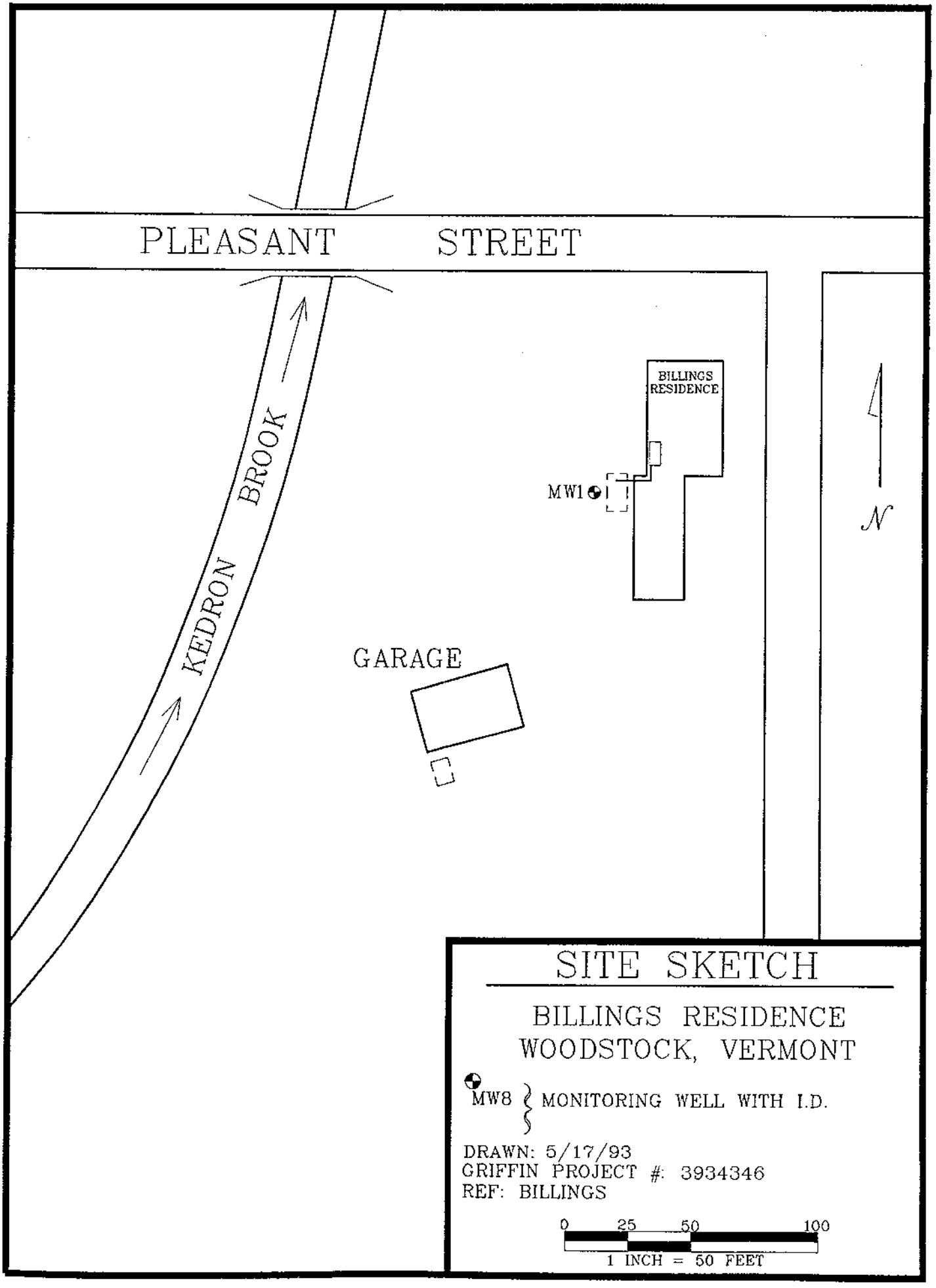
PROJECT: JUDGE FRANKLIN BILLINGS RESIDENCE
LOCATION: 4 BOND ST. WOODSTOCK, VT
INSPECTION DATE: JANUARY 26, 1993



MAP SOURCE: U.S.G.S WOODSTOCK NORTH AND WOODSTOCK SOUTH QUADRANGLES
SCALE 1:24,000

Griffin International, Inc.

A1



SITE SKETCH

BILLINGS RESIDENCE
WOODSTOCK, VERMONT

MW8 ≀ MONITORING WELL WITH I.D.

DRAWN: 5/17/93
GRIFFIN PROJECT #: 3934346
REF: BILLINGS

0 25 50 100
1 INCH = 50 FEET

A2

WELL NUMBER MW-1

PROJECT Billings Residence

LOCATION Woodstock, Vermont

DATE DRILLED 4/5/93 TOTAL DEPTH OF HOLE 16'

DIAMETER 4.25"

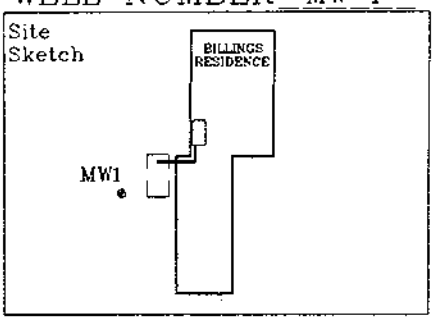
SCREEN DIA. 2" LENGTH 10' SLOT SIZE 0.010"

CASING DIA. 2" LENGTH 5.5' TYPE PVC

DRILLING CO. Green Mtn. DRILLING METHOD Hollow Stem

DRILLER Bernasconi LOG BY P. Murray

Site Sketch



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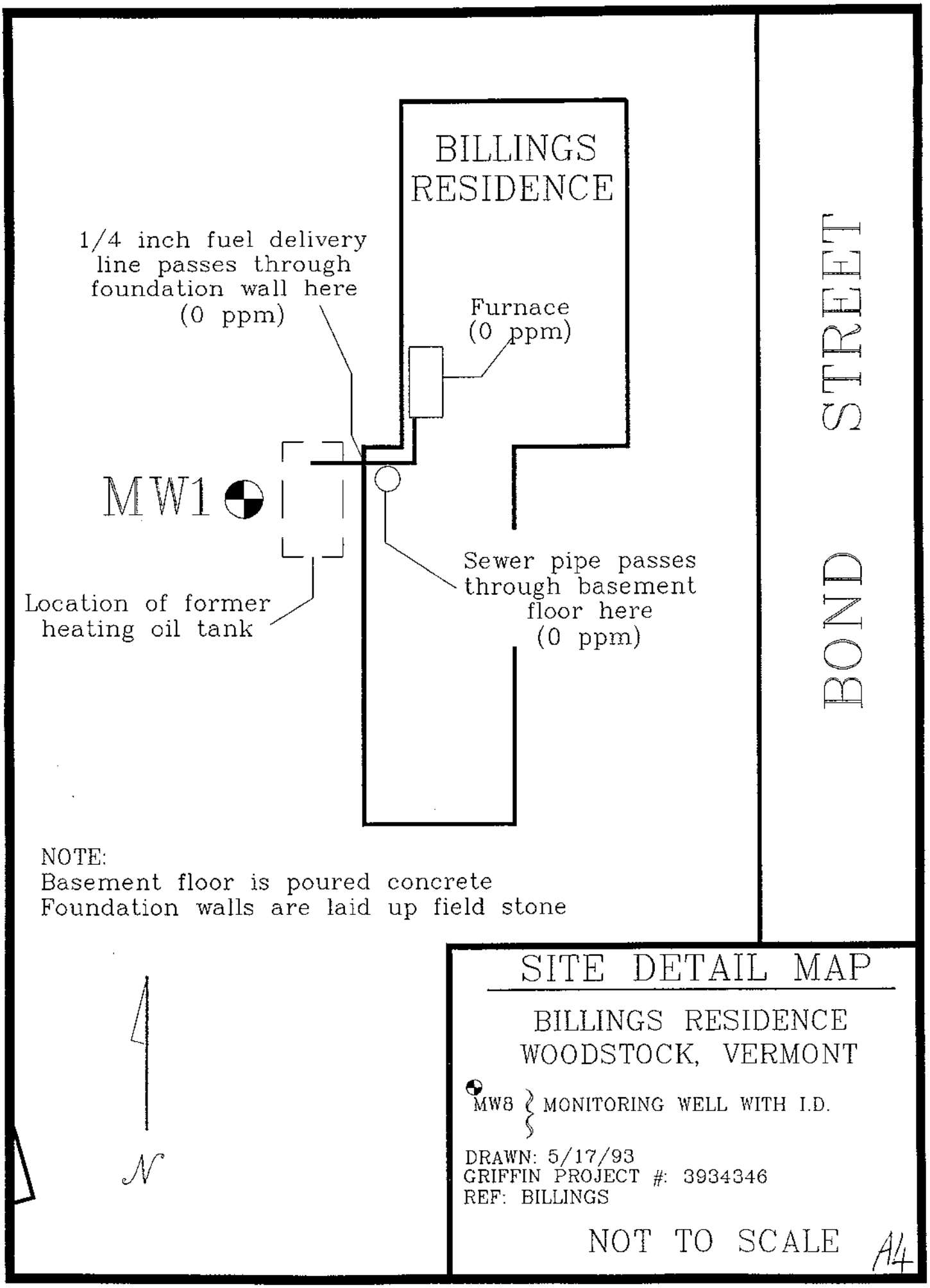
DEPTH IN FEET	WELL CONSTRUCTION	NOTES	BLOWS PER 6" OF SPOON AND PID READINGS	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)	DEPTH IN FEET
0–26	ROAD BOX LOCKING WELL CAP CONCRETE BENTONITE WELL RISER GRAVEL PACK WELL SCREEN BOTTOM CAP		0–1.5' 0 ppm 4–6' 18,13,6,4 0 ppm 9–11' 18,15,6,5 0 ppm 14–16' 8,6,3,3 <0.1 ppm	0–1.5' TOPSOIL 1.5–4' TOPSOIL 4–6' BRICK FRAGMENTS Few Large STONES Some Silty SAND 9–11' Wet, Med. to Coarse SAND, Some GRAVEL, Little SILT Cobble. NO ODOR 14–16' Wet, Fine to Coarse SAND, Some GRAVEL, Little SILT. NO ODOR. BASE OF EXPLORATION AT 16.0' Drilled to 16', Refusal on large Cobble/ Boulder or Bedrock.	0–26

A3


BILLINGS
RESIDENCE
1/4 inch fuel delivery
line passes through
foundation wall here
(0 ppm)
Furnace
(0 ppm)
MW1
Location of former
heating oil tank
Sewer pipe passes
through basement
floor here
(0 ppm)
BOND STREET
NOTE:
Basement floor is poured concrete
Foundation walls are laid up field stone
N
SITE DETAIL MAP
BILLINGS RESIDENCE
WOODSTOCK, VERMONT
MW8 MONITORING WELL WITH I.D.
DRAWN: 5/17/93
GRIFFIN PROJECT #: 3934346
REF: BILLINGS
NOT TO SCALE
A4